

WHAT IS CLAIMED IS:

1. A ball screw device comprising:

a nut that a first thread groove is formed on an inner surface thereof;

5 a screw shaft that a second thread groove is formed on an outer surface thereof;

a plural number of balls arranged between the first thread groove and the second thread groove; and

10 a deflector built into the nut to provide a ball-return path which returns the balls so as to circulate endlessly, wherein the deflector comprises a deflector piece which defines a top plate of the ball-return path and a guide member which defines sidewalls of the ball-return path.

15 2. A ball screw device according to claim 1, wherein: the deflector piece is shaped as an arch which comprises a pair of prop portions and an intermediate portion; the prop portions are inserted into a through hole formed into the nut; and a concavity as the top plate of the ball-return path is formed on an inner surface of the intermediate portion.

20 3. A ball screw device according to claim 2, wherein the guide member is shaped so that its cross section is an U-shaped having a pair of side portions as the sidewalls of the ball-return path, which sandwich the intermediate portion of the deflector piece.

4. A ball screw device according to claim 1, wherein a plural number of the deflectors are built into the nut at an equal interval in circumferential direction.

5. A ball screw device according to claim 1, wherein the ball screw device further comprises a plural number of separators which is arranged between each ball.

6. A ball screw device according to claim 1, wherein the ball screw device further comprises a nut housing that the nut is inserted therein, and an elastic member which is provided on an outer surface of the guide member; and the elastic member is engaged with an inner surface of the nut housing to fix the guide member to the nut.

7. A manufacturing method of a ball screw device which comprises a nut, a screw shaft, a plural number of balls, and a deflector which comprises a deflector piece and a guide member, the manufacturing method comprising:

attaching the deflector piece to the nut;

grinding an inner surface of the nut together with an inner surface of the deflector piece;

attaching the guide member to the nut; and

assembling the balls and the screw shaft to the nut.

8. A manufacturing method of a ball screw device which comprises a nut, a screw shaft, a plural number of balls, and a deflector which comprises a deflector piece and a guide member, the manufacturing method comprising:

attaching the deflector piece to the nut;

grinding an inner surface of the nut together with an inner surface of the deflector piece;

detaching the deflector piece from the nut;

assembling the balls and the screw shaft to the nut; and

attaching the deflector piece and the guide member to the nut.